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Exhibit R-2, PB 2010 Navy RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 1 - Basic Research					R-1 ITEM NOMENCLATURE PE 0601103N UNIVERSITY RESEARCH INITIATIVES					
COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	96.672	108.612	99.472						Continuing	Continuing
0000: UNIVERSITY RESEARCH INITIATIVES	96.672	108.612	99.472						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program includes support for multidisciplinary basic research in a wide range of scientific and engineering disciplines that enable the U.S. Navy to maintain technological superiority, and for university research infrastructure to acquire research instrumentation needed to maintain and improve the quality of university research important to the Navy. Multidisciplinary University Research Initiative (MURI) efforts involve teams of researchers investigating high priority topics and opportunities that intersect more than one traditional technical discipline. For many military problems this multidisciplinary approach serves to stimulate innovations, accelerate research progress and expedite transition of results into Naval applications. The Defense University Research Instrumentation Program (DURIP) supports university research infrastructure essential to high quality Navy relevant research. The instrumentation program complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. The program supports Presidential Early Career Awards for Scientists and Engineers (PECASE), single investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This program provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

B. Program Change Summary (\$ in Millions)				
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>
Previous President's Budget	98.057	103.707	97.580	
Current BES/President's Budget	96.672	108.612	99.472	
Total Adjustments	-1.385	4.905	1.892	
Congressional Program Reductions		-3.295		
Congressional Rescissions				
Total Congressional Increases		8.200		
Total Reprogrammings	-0.100			
SBIR/STTR Transfer	-1.257			
FTT Assessment	-0.028			
Program Adjustments			1.892	

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<u>Congressional Increase Details (\$ in Millions)</u>		FY 2008	FY 2009
Project: 9999, BLAST AND IMPACT RESISTANT COMPOSITES STRUCTURES FOR NAVY SHIPS		1.543	0.000
Project: 9999, CELL-BASED SENSORS FOR CHEMICAL THREATS		1.166	0.000
Project: 9999, CENTER FOR HETERO-FUNCTIONAL MATERIALS		1.931	0.000
Project: 9999, CENTER FOR NANOSCIENCE AND NANOMATERIALS (CNN)		1.160	0.000
Project: 9999, CENTER FOR SOUTHEASTERN TROPICAL ADVANCED REMOTE SENSING (CSTARS)		1.928	0.000
Project: 9999, COMPUTATIONAL MODELING AND HIGH PERFORMANCE COMPUTING IN ADVANCED MATERIAL PROCESSING, SYNTHESIS AND DESIGN		0.000	1.197
Project: 9999, HUMAN NEURAL CELL-BASED BIOSENSOR		0.000	0.997
Project: 9999, LOW ACOUSTIC AND THERMAL SIGNATURE BATTLEFIELD POWER SOURCE		1.928	1.994
Project: 9999, NATIONAL SECURITY TRAINING		1.928	1.596
Project: 9999, NEXT GENERATION AUTOMATED TECHNOLOGY FOR LANDMINE DETECTION		0.000	1.596
Project: 9999, RADIATION HARDNESS AND SURVIVABILITY OF ELECTRONIC SYSTEMS		0.000	0.798
Project: 9999, RESEARCH INFRASTRUCTURE FOR THE APPLIED PHYSICS LABORATORY		3.088	0.000
Project: 9999, UNIVERSITY RESEARCH INITIATIVES		7.713	0.000
<u>Change Summary Explanation</u>			
Technical: Not applicable.			
Schedule: Not applicable.			

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COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
0000: UNIVERSITY RESEARCH INITIATIVES	96.672	108.612	99.472						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project includes support for multidisciplinary basic research in a wide range of scientific and engineering disciplines that are important for maintaining the technological superiority of the U.S. Navy and for university research infrastructure to acquire instrumentation needed to maintain and improve the quality of university research important to the Navy. MURI efforts involve teams of researchers investigating high priority topics that intersect more than one traditional technical discipline. For many military problems this multidisciplinary approach serves to stimulate innovations, accelerate research progress and expedite transition of results into Naval applications. The DURIP project supports university research infrastructure essential to high quality Navy relevant research. The instrumentation project complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. The PECASE project supports single investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This project provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security.

B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>DEFENSE UNIVERSITY RESEARCH INSTRUMENTATION PROGRAM</p> <p>DURIP funds are provided to universities to purchase relatively high cost research instrumentation that is normally not included in single-investigator type research grants. Individual grants range from \$50K to \$1M.</p> <p>The DURIP program is an OSD interest item and OSD directs that funding for the DURIP efforts be awarded after OSD announces the awardees, which typically takes place towards the second half of the fiscal year. In turn, universities need to purchase the instrumentation and take delivery before any billings are generated. It frequently takes several months for delivery and billing to be completed.</p> <p>The increase from FY 2008 to FY 2009 is due to the number of awards increasing from 55 to 113. The program decreases in FY 2010 and again in FY 2011 to allow for the steady increase in the MURI and PECASE programs.</p>	22.670	30.594	19.302	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Conducted competition for 55 research instrumentation awards to universities. <p><i>FY 2009 Plans:</i></p> <ul style="list-style-type: none"> - Conduct competition for research instrumentation awards to universities. <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Conduct competition for research instrumentation awards to universities. 				
<p>MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE (MURI)</p> <p>Research efforts include high priority topics that intersect more than one traditional discipline. MURI topics are selected to address Naval S&T Focus Areas as described in the Naval S&T Strategic Plan.</p> <p>The MURI program is an OSD interest item and OSD directs that funding for the MURI efforts be awarded after OSD announces the awardees, which typically takes place towards the second half of the fiscal year. Since the MURI program funds academic researchers, execution of the efforts typically ramps up during the summer academic break months. MURI projects make significant contributions to Navy and DoD objectives by; speeding up scientific programs by cross-fertilization of ideas, hastening the transition of basic research to practical applications, and training students in cross-disciplinary approaches to science and engineering research of importance to DoD.</p> <p>The increase from FY 2008 through FY 2010 is due to OSD direction to increase peer-reviewed basic research in order to develop innovative solutions and to enhance the science and engineering personnel base.</p> <p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Conducted competition for \$5,615K of new MURI awards addressing selected high priority naval science and technology areas, transformational activities, and grand challenges, including strategically important DoD research areas. Six topics were identified for publication via Broad Agency 	51.006	66.822	73.850	

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B. Accomplishments/Planned Program (\$ in Millions)			FY 2008	FY 2009	FY 2010
<p>Announcement (BAA) to solicit proposals. These topics addressed electronic device reliability, analysis of networks, autonomous sea vehicles, asymmetric threat environment, biometrics in the marine domain, and unmanned systems for surveillance over large and complex areas. Remaining balance was spent to continue MURI projects begun in prior years.</p> <p><i>FY 2009 Plans:</i></p> <ul style="list-style-type: none"> - Conduct competition for new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. About six high priority research topics will be identified for publication in a BAA to solicit proposals. Remaining balance will be spent to continue MURI projects begun in prior years. <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Conduct competition for new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. About seven high priority research topics will be identified for publication in a BAA to solicit proposals. Remaining balance will be spent to continue MURI projects begun in prior years. 					
<p>PRESIDENTIAL EARLY CAREER AWARDS</p> <p>PECASE awards are made to academic scientists early in their research career for extremely prestigious single-investigator research in areas of vital importance to DoN. Awards provide national recognition and research grants of \$200K per year for five years.</p> <p>OSD, with policy and oversight responsibility for the PECASE program, directed that the value of PECASE awards be increased from \$100K to \$200K per year and that the DoN limit for the number of PECASE awards each year be increased from two to ten. An increase in award size permits outstanding early career researchers to focus fully on DoD problems, build long-term relationships with Navy and train more graduate students in relevant fields. An increase in the number of awards permits a larger number of these outstanding researchers to contribute to the DoN S&T requirements.</p>			0.611	3.018	6.320

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B. Accomplishments/Planned Program (\$ in Millions)							FY 2008	FY 2009	FY 2010	FY 2011
<p>The increase in funding from FY 2008 through FY 2010 reflects ramp up of these five year awards from \$100K per year to \$200K per year, and increase in award selections from two in FY 2008 to nine in FY 2009, and to ten award selections of FY 2010.</p> <p><i>FY 2008 Accomplishments:</i></p> <ul style="list-style-type: none"> - Selected two outstanding university researchers to receive the five-year PECASE research awards to conduct research of importance to the Navy. Continued PECASE programs begun in earlier years. <p><i>FY 2009 Plans:</i></p> <ul style="list-style-type: none"> - Select nine outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. Continue PECASE programs begun in earlier years. <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> - Select 10 outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. Continue PECASE programs begun in earlier years. 										
C. Other Program Funding Summary (\$ in Millions)										
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	Cost To Complete	Total Cost
PE 0601103A/University Research Initiatives									Continuing	Continuing
PE 0601103F/University Research Initiatives									Continuing	Continuing
PE 0601153N/Defense Research Sciences									Continuing	Continuing
D. Acquisition Strategy										
Not applicable.										

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<p><u>E. Performance Metrics</u></p> <p>This University Research Initiative seeks to improve the quality of defense research conducted by universities and supports the education of engineers and scientists in disciplines critical to national defense needs. The initiative is a collection of specialized research programs performed by academic research institutions. Individual project metrics are tailored to the needs of specific applied research and advanced development programs. Example metrics include extending the life of Thermal Barrier Coatings for transition to the Enterprise and Platform Enablers Future Naval Capability program. It is projected that the life time of Thermal Barrier Coating on Turbine Blades can be doubled. The National Research Council of the National Academies of Science and Engineering's Congressionally directed "Assessment of Department of Defense Basic Research" concluded that the DoD is managing its basic research program effectively.</p>		

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